v. 11 #3

The MONTHLY REVIEW

Published Monthly by the

American Electroplaters Society

A SOCIETY FOR THE ADVANCEMENT
OF THE
SCIENCE OF ELECTROPLATING

MARCH, 1924

Entered as second-class matter, September 26, 1922, at the Post Office at Oneida, N. Y., under the Act of August 24, 1912.

Acceptance for mailing at special rate of postage, provided for in section 1103, Act of October 3, 1917, authorized September 26, 1922.

KRESGE-HOOK
WAYNE
UNIVERSITY
SCIENTIFIC LIBRARY

EXECUTIVE BOARD, A. E. S., 1923-1924

President
John E. Sterling, 468 Grand Ave., Long Island City, N. Y.

First Vice-President
E. J. Musick, 915 Chestnut St., St. Louis, Mo

Second Vice-President
W. E. Woodmansee, 1427 Lee Place, Detroit, Mich.

Secretary-Treasurer
Frank J. Hanlon, 216 N. Jefferson St., Chicago, Ill.

Past President
Walter J. Allen, 451 Norwood Ave., S. E., Grand Rapids, Mich.

Editor
F. C. Mesle, 166 Willow Place, Sherrill, N. Y.

Associate Editor
Dr. W. Blum, Bureau of Standards, Washington, D. C
Joseph Hass, Jr., 211 South High St., Muncie, Ind.

JUMPING around from one job to another will ultimately drag any man down to the bottom of the ladder and make him a stepping stone for the real stickers in the game of business.

When you feel the fancied greater opportunities of other fields tugging at your sleeve just hold a short communion with yourself and remember that it's the man and not the line which achieves success.

You will then decide that there is nothing better than the work you are doing and that you make your own opportunities by the spirit you put into your task every day of the year.

The fellow who attempts to dodge that fact is only kicking progress in the shins.

BRANCH NEWS

MONTHLY REVIEW

Published by the

American Electroplaters' Society

ONEIDA, NEW YORK

Editor's Office, 166 Willow Place, Sherrill, New York

VOL. XI MARCH, 1924 No. 3

EDITORIAL

A. E. S. PRIZE AWARD

To the Officers and Members of the A. E. S.:

In accordance with the desires expressed by the delegates at the Providence Convention, regarding the matter of an A. E. S. prize award, the Supreme Executive Board has adopted the following plan, to wit:

1st. A committee of five to be appointed by the Supreme President, to be known as the Exhibits Committee of Award, to decide upon the winners of the first, second and third prizes of the finished products contest.

3rd. The prizes for the two contests mentioned above to consist of certificates of award, of the first, second and third class, to be known as the Gold certificate, Silver certificate and Bronze certificate.

4th. These two committees, in conjunction with the second Supreme Vice-President, to act as a Prize Medal Committee, they to decide the winners of a gold medal, to be known as the Founders' Medal, this medal to be awarded for the best paper or process that shows a distinct improvement over what is now known in commercial practise. This medal will be recognized (as is the universal practice in all educational institutions and societies) as the highest award. This medal to be awarded to any member, whether he is a winner in either one of the prize contests or not.

5th. The basis to govern the award of the "Exhibit Prizes" to be not only the best and most valuable to the society, but also the most economical and efficient method of turning out the work or product commercially.

6th. The basis to govern the award of the prizes for the papers presented should be, for the most valuable idea, or information contained in any one paper or part of a paper presented at any branch meeting, branch banquet or published in the REVIEW during the fiscal year or presented at any of the educational sessions of the annual meetings.

7th. The awarding of the prizes or the announcement of the winners to be made by the retiring Supreme President, right after the newly elected officers are installed. This to be an annual event.

8th. To finance the above a Research Fund will be created and maintained by:

1st. A yearly donation from the Supreme Treasury of $125 per year.

2nd. A yearly donation of at least $5 per year (or more if they can afford it) from the subordinate branches, and by donations from individuals and from the manufacturers of plated products, as well as from the manufacturers of and jobbers in plating supplies and equipment.

Out of this fund is to be paid the cost of printing the certificates, of procuring the Gold Medal, which will be of a standard design; also the expenses of the Supreme Research Committee.

It would be unjust to present this plan without giving due credit to Messrs. Lamoureux and Proctor, who have given a great deal of time and thought to this matter. In fact, it is due to the iniatitive of these members who always have the welfare of the society at heart, that this plan has been adopted. Now, that these two members have shown the way, it is up to you to get busy and go after these prizes by getting to work on papers and finished samples. Be one of the first prize winners.

Asking your co-operation in making this a success, and hoping to meet all of the "regulars" and a great many new comers at the Milwaukee Convention, which, we hope, will be the best yet.

Sincerely yours,
JOHN E. STERLING,
Supreme President.

BEHAVIOR OF NICKEL ANODES[1]

By C. T. Thomas[2] and W. Blum[3]

[1]Published by permission of the Director of the Bureau of Standards, Department of Commerce.

[2]Assistant Chemist.

[3]Chemist.

In connection with the general researches on nickel deposition at the Bureau of Standards, the behavior of nickel anodes was investigated. The purpose of this study was to survey the field, obtain reliable data upon the behavior of typical nickel anodes under definite conditions and point out the principal factors involved in their operation. A much more detailed study and more extensive plant observations will be required before the composition, preparation and properties of nicked anodes can be completely specified.

The details of the methods of study and of the numerical results obtained will be published in the Transactions of the American Electrochemical Society. In the paper here presented the results and conclusions of special interest to electroplaters are summarized.

To be entirely satisfactory, a nickel anode should corrode uniformly, with a low polarization and with a high anode current efficiency, and should not introduce any deleterious substances into the solution.

If an anode does not corrode uniformly, small particles of metal are likely to become detached, and if they are carried over to the cathode they may cause roughness on the deposits. If large masses drop off there is a waste of nickel.

If a metal such as copper is made the anode in a solution of that same metal (e. g., copper sulphate), it will dissolve or corrode just as soon as a certain voltage or potential difference is produced **between it and the solution.** This potential difference is called its static or equilibrium potential. If, however, a metal such as nickel is used, it requires a potential greater than its equilibrium potential to cause it to dissolve; in other words, it tends to become "passive." The excess potential is a measure of the **anode polarization** under those conditions. If this polarization is high, it requires a higher voltage to be applied to the bath

to produce a certain current density or rate of deposition. The total voltage required under otherwise uniform conditions to produce with different anodes a certain current density upon them and upon the cathodes, is therefore a relative measure of the extent of the polarization with these respective anodes. If the polarization is high, oxygen may be discharged upon the anodes and cause "gassing" there.

The **anode current efficiency** is the proportion of the current which is used in dissolving metal from the anode. If in a certain case ten per cent. of the current is used in the liberation of oxygen, the remainder, i. e., ninety per cent., is consumed in dissolving nickel, in which case the anode efficiency is ninety per cent. Similarly the **cathode efficiency** is the proportion of the current used in the deposition of nickel and the balance is employed in liberating hydrogen on the cathode.

If in a given nickel plating bath the anode efficiency is exactly equal to the cathode efficiency, the bath will remain constant in composition and concentration (except for mechanical loss of solution which adheres to the cathodes when they are removed, and which is replaced by water). If, however, the anode efficiency is not as high as the cathode efficiency, the nickel content of the bath decreases and at the same time the solution become more acid, i. e., the "pH" decreases, and poor deposits will result. If the anode efficiency is higher than that at the cathode, the metal content increases and the solution becomes less acid.

In order to measure the anode efficiencies of various kinds of nickel anodes, each was rotated separately in a small jar and the amount of nickel which dissolved when a given current was passed, was determined from the weight of nickel deposited on the cathode, and the change in nickel content of the solution. It is not possible to measure the anode efficiency with any accuracy from the loss in weight of the anodes because small particles may drop off, or solution may be absorbed in the pores on the anode. In order to obtain reproducible results, the anode surfaces were kept clean. These results therefore represent the relative behavior of clean anodes and not of those upon which sludge has accumulated.

Three types of solutions were used in the experiments. The "single salt bath," No. 3, contained 19 oz/gal of nickel sulphate and 2.1 oz/gal of boric acid. No. 2, the "double salt solution," had the same total amount of metallic nickel (4 oz/gal), but contained 14 oz/gal of the single salt, 6.7 oz/gal of the double salt (nickel ammonium sulphate) and 2.1 oz/gal of boric acid. No. 1, the "chloride bath" contained 19 oz/gal of single salt, 2.1 oz/gal of boric acid, and 1.8 oz/gal of ammonium chloride.

The principal results obtained are summarized in Table 1. Each anode was run in each solution at two current densities, viz., 4.6 and 14 amp./sq. ft., but only the results at the lower and more usual anode current density are tabulated. In general at higher current densities the anode efficiencies were lower than those listed. The bath potntial V, given for only part of the anodes, represents that required to produce this current density in the particular apparatus used. The figures represent therefore the relative and not the actual potentials that may be required in any other baths in actual commercial use, and are included merely to indicate the relative extent of the polarization under different conditions.

CONCLUSIONS

From the results in Table 1 and other data, the following conclusions may be drawn regarding the behavior of these anodes under the conditions used in these tests.

A—**Composition of Solution.** In solutions such as No. 1 containing an appreciable amount of a chloride, e. g. soduim chloride or ammonium chloride, the anode efficiency of all the anodes is very close to 100 per cent. A few experiments with solutions containing fluoride instead of chloride, showed that fluorides do not increase the anode efficiency appreciably above that in the plain single or double salt solutions.

In solutions containing chlorides, such as are now generally used, the choice of anodes will therefore depend principally upon their purity and the uniformity of their corrosion.

B—**Composition of Anodes.** The anodes in Table 1 may be divided roughly into two classes, viz (a) those con-

TABLE 1

Behavior of Nickel Anodes at 4.6 amp./sq. ft.

Anode No.	Description	Solution Composition[3] C	%	1-Chloride An. Ef. %	V	2-Double Salt An. Ef. %	V	3-Single Salt An. Ef. %	V
1	Electrolytic			100	1.20	53	2.45	36	2.50
2	Rolled	0.1		100	1.25	68	2.40	68	2.55
3	Oxidized		0.5 NiO	100	0.90	90	2.35	73	2.50
4	Sand cast	0.1		99		80		84	
5	Chill cast	0.4		100	1.20	91	2.35	91	2.40
6	Sand cast	0.4		99	1.25	89	2.35	91	2.35
7	Chill cast	1.5		99		94		94	
8	Sand cast	1.5		99	1.20	96	2.25	95	2.25
9	" "	0.5	0.15 S	98		93		95	
10	" "	0.5	" +Mg	98		78		77	
11	" "	1.5	0.15 S	98		94		95	
12	" "	1.5	" +Mg	99		90		92	
13	" "	0.1	1.5 Fe	98		78		80	
14	" "	1.5	"	99	1.20	96	2.10	96	2.25
15	" "	1.0	6.0 Fe	99		93		93	
16	" "	1.5	1.5 Si	95		94		94	
17	" "	1.5	1.0 Cu	100		100		95	
18	" "	1.5	1.0 Sn	99		83		89	
19	A Shot[2]	0.1		98		83		89	
20	M Shot[3]	0.06		99		80		60	

[1]C=carbon, NiO=nickel oxide, S=sulphur, Mg=magnesium, Fe=iron, Si=silicon, Cu =copper, Sn=tin.

[2]Chilled shot, made by pouring molten nickel into water.

[3]Spherical shot, made by the Mond process.

sisting of nearly pure nickel, such as the electrolytic, rolled, shot and oxidized nickel; and (b) those containing appreciable amounts of other elements, such as carbon, iron, silicon and tin which are often added intentionally, chiefly for the purpose of lowering the melting point and facilitating casting.

All forms of nearly pure nickel have a relatively low anode efficiency in solutions which do not contain chlorides, but a high efficiency if chlorides are present. The effects of various additions may be summarized as follows.

Carbon—Carbon is the most common addition to cast nickel anodes, which usually contain from 0.5 to 2.0 per cent of carbon. Its chief effect upon the behavior is to decrease the passivity and polarization and to increase the anode efficiency in solutions which do not contain chlorides. If more than about 0.5 per cent of carbon is present, it crystallizes out as graphite, the particles of which accelerate the corrosion of the nickel because the graphite is less readily attacked than the nickel. The more graphite is present in a finely divided condition, the more uniformly does the anode corrode.

Nickel Oxide—Nickel which is melted with no addition of carbon, may contain a small amount of nickel oxide (No. 3). This substance separates on cooling, and as it is less soluble than nickel it also aids in the corrosion of the nickel.

Nickel Sulphide—If from the gas, oil or coal used in melting the nickel, any appreciable amount of sulphur is taken up, it forms nickel sulphide which separates along the grain boundaries of the nickel. As however nickel sulphide is more readily attacked than nickel, it dissolves out first and allows the particles of nickel to drop out. The presence of an amount of sulphur above 0.10 per cent in nickel anodes is therefore deleterious, especially if the carbon content is below 1 per cent. This effect of sulphur is not overcome by adding magnesium to the molten nickel.

Iron—Moderate amounts of iron in nickel anodes which contain sufficient carbon, tend to produce more uniform corrosion. It has been shown that iron is not necessarily detrimental in nickel solutions. As, however, it is seldom beneficial and as it does cause an accumulation of sludge

upon the anodes and in the solutions, there is no justification for adding it to the anodes, as was done with the 90-92 per cent anodes which were formerly in general use.

Copper—Small amounts of copper have been shown to be very harmful in nickel solutions, and therefore no copper should be added to nickel anodes. If, as an accidental impurity, the anodes contain not over 0.25 per cent of copper, and they are dissolving readily, i. e. are not passive, most of this copper will stay on the anodes and not contaminate the solution or the deposit.

Silicon and Tin—Both of these elements may be added to nickel to aid in the casting. They have no beneficial effect on anode behavior, and they pass into the sludge and not into the deposit. To the extent that they increase the sludge formation upon the anodes or in the solution, they are objectionable.

C—**Type of Anodes.** As all kinds of nickel have a high anode efficiency in solutions containing chlorides, differences in behavior relate chiefly to the uniformity of corrosion. A greater tendency toward detachment of small particles was observed with the electrolytic, rolled, shot and chilled cast anodes than with the high carbon sand cast anodes. It is tentatively suggested that cast nickel anodes should be sand cast and should contain not less than 95 per cent of nickel and 1.25 per cent of carbon, and not more than 0.1 per cent of sulphur or 0.25 per cent of copper. Amounts up to 1 per cent each of iron, tin, and silicon may be permitted, but are not recommended.

Potentials—The most significant conclusion from the bath potentials listed in Table 1 is that to produce a given current density in the chloride solutions approximately one volt less is required than in baths containing no chlorides. This illustrates the great advantage of chlorides in reducing the passivity and polarization of nickel anodes.

The difference in voltage between different anodes in the chloride solution is usually only 0.1 to 0.3 volt. Such differences have no economic significance in themselves. They illustrate, however, the behavior of two kinds of anodes, e. g. electrolytic and cast, if they are hung simultaneously in the same bath or in similar baths connected in parallel with the same voltage applied to each. In such

cases most of the current will pass to the cast anode, i. e. the one which will dissolve at the lowest potential and in consequence more metal will be dissolved from it than from the electrolytic anodes. This is no proof, however, that the elestrolytic anode would not corrode with a high anode bath, or in parallel baths.

As previously indicated, more extended observations upon the commercial preparation and use of nickel anodes will be needed before their behavior can be thoroughly understood. It is hoped that such study and observation will be stimulated by the publication of the results of these laboratory experiments.

THE DEPOSITION OF BRASS

By Willard M. Scott of Philadelphia Branch, Feb. 1st, 1924

To deposit brass upon other metals it is essential to cause copper and zinc to deposit simultaneously, this forming the alloy called brass, whose color depends on the quantitative proportions of both metals, and with the proper regulation of the current, beautiful deposits are obtained.

Brass plating solutions seem to be the most difficult to operate. Every plater will show difference of opinion regarding the composition of brass solutions, and platers with abnormal proportions of ingredients will get wonderful results, but at some time he finds himself seeking advise from his fellow platers, and finds himself alone pertaining to his formula, conditions of current, etc.

Now, in considering these two metals, we know by experience that copper and zinc are two opposite metals—the zinc positive, copper negative—and that zinc and copper have different current force to plate in our regular solutions, and in combining these two metals we find that copper will plate at a lower current, consequently the deposit becomes redder, while vice versa, the color being pale yellow to greenish.

A new brass solution is very irregular. The deposit is either too red or too gray, and if same is worked for a day with the current until the solution is thoroughly ionized, this will be overcome.

A brass bath at a certain manufacturing company has

been in constant use for two years, and is a three-to-one portion, the copper being the greater. Arsenic is being used for color and at times ammonia is added for brightener. The anode surface is as large as possible, and although the composition of the anodes are unknown they should be the same combination to form the color as desired in your deposit.

Now, there will come a time when the determined color cannot be produced by a lower or higher current. It is then evident that your solution should be replenished by your metallic constituents, or, as we know, copper is generally the ingredient that again controls the bath along with the addition of bisulphite of soda.

Free cyanide is essential.

Excess cyanide the deposit is formed slowly or not at all, with the fast evolution of gas, and when there is a deposit it has a tendency to peel when scratch-brushing.

The amperemeter is an indicator and cyanide can be controlled by this.

FILTRATION SYSTEM FOR NICKEL PLATING PLANT

R. L. Shepard, Detroit Branch, American Electroplaters' Society

A filtration system designed as shown in the accompanying print was installed and has been in satisfactory operation for several months covering the periodic filtration of fourteen nickelplating tanks with an aggregate capacity of about 10,000 gallons.

The pressure filter consists of a galvanized iron tank of about 100 gallons capacity, setting in an angle iron support, with conical shaped bottom ending in a draw-off connection, solution inlet near the top, and a tight bolted cover with small pet-cock as an air vent. At the top of the cone is a false bottom consisting of a steel perforated plate covered with a No. 60 mesh copper or monel metal gauze. Above this is one or two thicknesses of a special heavy, closely woven, canvas filter cloth. The canvas is held with a steel hoop tightened against the sides of the tank with a turn buckle. The space back of the turn buckle, and any other imperfect seams between the hoop and the tank, are caulked with cotton wicking. A draw-off cock is also pro-

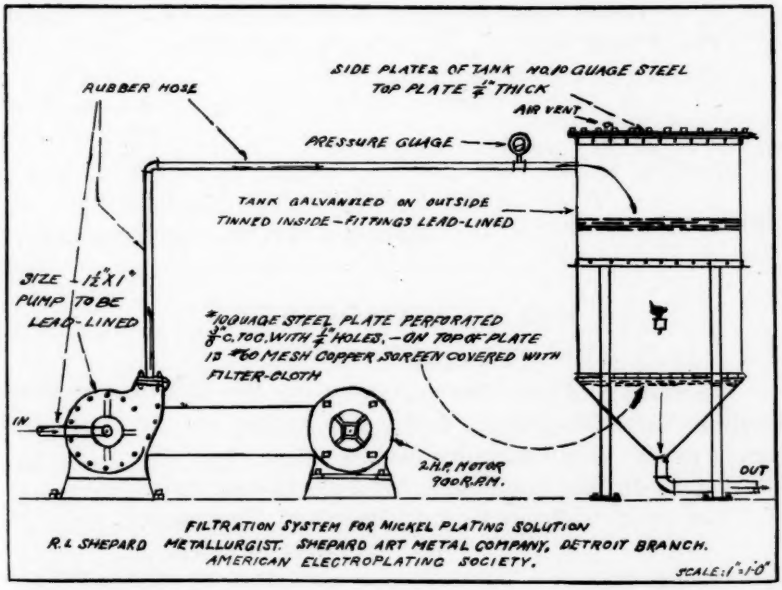
vided just above the false bottom. The interior of the tank is tinned.

The centrifugal pump is a standard lead-lined pump, 1½" inlet and 1" discharge, and should be run at 500 to 800 revolutions per minute and delivers a pressure of 5 to 10 pounds at the top of the filter.

The motor is 2 h. p., 900 r. p. m. belt connected to the pump.

All fittings and valves are lead lined or tinned. Connection is made between the pump and filter with a 1" rubber hose. For bringing the solution to the pump a 1½" rubber hose is provided long enough to reach to the farthest tank. For returning the solution from the filter a 1" hose is provided of the same length.

In operation the pump is primed by filling the intake hose from the tank to be filtered. The end of the hose is then run to the bottom of the tank and the pump started.


SIDE PLATES OF TANK NO.10 GUAGE STEEL
TOP PLATE ¼" THICK
RUBBER HOSE
AIR VENT
PRESSURE GUAGE
TANK GALVANIZED ON OUTSIDE
TINNED INSIDE – FITTINGS LEAD-LINED
SIZE 12"X1" PUMP TO BE LEAD-LINED
#10 GUAGE STEEL PLATE PERFORATED
8" C. TO C. WITH ¼" HOLES, – ON TOP OF PLATE
IS #60 MESH COPPER SCREEN COVERED WITH FILTER-CLOTH
IN
2 H.P. MOTOR 900 R.P.M.
OUT
FILTRATION SYSTEM FOR NICKEL PLATING SOLUTION
R. L. SHEPARD METALLURGIST. SHEPARD ART METAL COMPANY, DETROIT BRANCH.
AMERICAN ELECTROPLATING SOCIETY.
SCALE: 1" = 1'-0"

Solution is then run into the filter, the air vent being open until the tank is filled. The clear solution is then returned with the delivery hose to the same or any other tank. When first started with a clean filter cloth the solution will not be clear, but after running for an hour or two the slime will fill up the pores and the filtered solution become cleaner and cleaner.

The particular advantage of this style of apparatus is its adaptability to any number of tanks in any position in the room. By cutting out the filter it can also be utilized for transferring solution from one tank to another or as a means of continuous agitation.

Estimated cost of the various items included in the equipment is as follows:

Filter tank	$ 50.00
Lead lined centrifugal pump 1½"x1"	253.00
2 h. p. motor	80.00
Fittings, valves and gauges	15.00
100 ft. 1½" hose	34.00
100 ft. 1" hose	25.00
Two yards filter cloth	3.00
Millwright work	15.00
Electrical connections and labor	35.00
Total	$510.00

April 6, 1923.

R. L. SHEPARD, Metallurgist,
Shepard Art Metal Company.

S. O. S. BROADCASTING STATION MIL-WIS.

We want and must have papers for the Milwaukee Convention, June 30-July 1, 2, 3. All papers should be in the hands of the committee by May 1.

Get in on the big prizes for papers and exhibits.

Educational Program Committee:
DAN WITTIG,
ARTHUR E. KIENTH.

Address all communications to Dan Wittig, 375 3rd street, Milwaukee, Wis.

PLATING SIMPLIFIED

By Hedley Richards

I wish to write a modern book on plating, don't you know.
I intend to make the whole thing clear as mud,
So that any bright hod carrier can learn the platers' art
By means of ten short lessons and a simple little chart,
Which will banish platers' troubles and cause them to depart
And Langbien's books will look just like a dud.

I'll tell the platers how to clean for plating, don't you know;
The instructions in this line will be quite strong;
If your work ain't cleaned correctly, for good plating you can't hope.
The grease will be soaponified if you have the right dope;
For if you're right you never can be wrong.

I'll tell the platers how to make solutions, don't you know;
This book will be the platers' guide and steer.
The laws that govern plating I will very clearly show,
And why the little ions chase each other to and fro;
I'll explain extremely plainly all the things that I don't know;
In fact, I'll make those subjects extra clear.

I'll have a special page for all the modern tests, you know;
How to use all those new color indicators.
What Ed. Heil and Fred Liscomb do the platers all can do;
How to tell the acid contents with the good wife's washing blue,
And how to use the menthol red or any other hue,
And increase your troubles with trouble eradicators.

I'll answer any questions before they're asked, you know,
In language both explicit and emphatic.
I will explanation plainly how to plate a plate that's tough;
A plate that ain't too brittle and a plate that ain't too rough;
How not to buff the work too much, but buff it just enough.
I'm really clever though I'm ungramatic.

I wish to do the platers and do them good, you know,
And shower on them benefits galore,
And platers over all the land will call me a good chap,
For plating will be simplified so much 'twill be a snap.
They'll erect a statue to my name all made of nickel scrap
When I take wings to reach the golden shore.

TRY THIS FOR NICKEL ITCH

Three parts of petrolatum are mixed with one part of lanolin. This mixture is melted on a water-bath or stove, and when melted and thoroughly mixed, ten to fifteen drops of 90 per cent. carbolic acid as added to every four hundred grammes of the mixture.

This represents five drops of acid to four grammes of ointment. The material is placed into a glass or earthenware jar and allowed to solidify, until ready for use.

The workman cleans his hand and arms thoroughly with soap and water and while the parts are still moist, applies the ointment. He rubs it over the whole exposed area for about two or three minutes. He then takes a clean cloth and wipes the skin entirely dry.

DR. GASKILL

CORRECTION

There was a typographical error in the February REVIEW, giving the wrong date for the Milwaukee Convention. The convention dates are June 30 and July 1, 2 and 3, 1924. Letters have been sent to all manufacturers, employing platers, urging them to send delegates to this convention.

LOOK HERE, FELLOWS

Don't forget that paper you are going to write to be read at the Annual Convention in Milwaukee this summer. Do it now, Brother—do it now. The Committee is very anxious to have you send papers in so that they will be able to publish an up-to-the-minute program.

BRANCH NEWS

Toronto Branch

Having been favored by speakers from outside the Society, for several meetings past, our members desired to have an evening for general study and discussion. We therefore, interested ourselves with three papers from members. Mr. G. V. Gray of Dartsmouth, Nova Scotia, presented a paper on "The importance of cleaning as compared to selection of plating solution". Mr. Gray is a very successful plater and is not influenced by the "speed-bug". He contends that a good double sulphate nickel solution will give results if work is properly cleaned, but that the nickel solution ranks second in importance when compared to cleaning solution and methods of using same. Mr. Gray uses Sodium Carbonate and Rosin solution with electric current. He said, he operated simple double sulphate nickel solutions for nine years without any additions of acids or alkali during the entire time and cleaned tanks only once each year, he had only 14 failures out of 144,000 pieces plated in these solutions.

Mr. James Welsby of Stratford, Ont., presented a paper on "Monde Metal". The paper was very much appreciated by those present. Mr. Welsby illustrated his paper with nine very fine samples of finishes he has obtained by various methods. A description of the metals properties, uses and possible uses was given, as well as directions for producing the finishes as shown.

Mr. J. S. Cairns presented a paper on "Art in the production of ornamental iron finishes", and illustrated his paper with a splendid display of sample pieces finished in a truly artistic manner. Mr. Cairns stated that some architects are actually color blind and cause much trouble for the plater of ornamental iron, also, that the position occupied by finished piece of work with relation to light was an important point to bear in mind, if this information could be ascertained. A hearty vote of thanks was accorded to three members for their efforts.

Question—How can green brass be deposited from barss sol.

Answer—Use ordinary brass anode (66 cu and 34 Sn) and use arsenic, together with low current density.

Preparations for lecture by Dr. Wm. Blum on Wednesday, April 9th, are practically completed. The lecture will be given in the Mining Building of Toronto University and every effort will be made to pack the auditorium to full capacity.

At our March meeting, Mr. F. H. Thiers will give his second talk of a series on "Plating Generators".

Toronto Branch is progressing in a very gratifying manner, the attitude of the members is optimistic in every way. We intend to grow in membership, influence and wisdom and prove our society an actual asset to the community in which we live and work.

St. Louis Branch

Regular meeting was held March 4 with a good attendance. One applicant was elected to membership and one application for member-

ship was received and referred to board of managers. The convention "Booster" committee, with E. J. Musick, chairman, are working along new lines and the open meeting sometime in May will be in the hands of that committee.

Under direction of our librarian several questions were answered. Considerable time was taken up discussing the relative values of caustic soda and caustic potash as a base for cleaners; also comparative cost.

Waterbury Branch

The members of Waterbury Branch and also a large number of representatives from local and out-of-town manufacturing concerns, were much pleased with the lecture of Dr. Blum in this city on March 3, the subject being "Researches in Nickel Deposition." As a result of the lecture, several inquiries have been received relative to membership in the A. E. S. At the last meeting of the branch, several of the important points of the lecture were taken up and thoroughly discussed. Robert Johnson and Harry Johnquest talked on the accidity and alkalinity of nickel solutions; also on the cause, effect and remedy for same. The question of the best test for determining same was also gone into. The subject of imperfections in lacqure work was also up for discussion. Mr. Troxler of the Cleveland Branch made a few remarks relative to same. Mr. John Lynch, superintendent of the Blake & Johnson Co., a local concern, and which recently bought out the No Dust Dryer Co. of Providence, R. I., was present and gave a demonstration with models of drying and washing machines. A communication was received from an out-of-town member of the branch, asking for information relative to the using of a central tank for draining a plating solution back to, filtering and repumping into the plating barrels; the latter being of the tilting variety. As there are no concerns in this vicinity using this system, the desired information was not obtainable.

Chicago Branch

Chicago Branch held its regular meeting March 8 with President Hanlon in the chair. We had a large attendance and the members made the meeting very interesting.

We received two applications, making a total of 14 since June 1, 1923; we also elected one applicant to active membership. One of our members has got his convention paper ready, and we are sure there will be more. The question of creating a research committee was thoroughly discussed, and the president appointed the following to serve on this committee: O. E. Servis, chairman; F. L. Greenwald, J. C. Kretschmer, E. G. Stenberg, H. A. Gilbertson and R. J. Hazucha.

In the absence of our librarian, H. A. Gilbertson, Mr. O. E. Servis acted in that capacity and he soon found that he had his hands full with the following questions:

Question No. 1. What is the best way to nickel plate die castings?

Answer No. 1. Clean in gasoline, dry in hardwood sawdust, clean in mild alkali cleaner, strike in bright brass for about five minutes, rinse and nickel plate with a moving cathode rod.

Question No. 2. Why does a grayish color form on brass anodes when bath is not in use?

Answer No. 2. The free cyanide in the solution dissolves the copper from the surface of the anode, leaving a zinc compound on the surface which is not soluble in cyanide, but will dissolve in caustic soda.

Question No. 3. About how much sodium chloride can be added to a nickel solution before it becomes detrimental to the solution?

Answer No. 3. One ounce of sodium chloride to every ounce of metalic nickel was recommended.

Question No. 4. Is there any benefit in using potassium chloride instead of sodium chloride in a nickel solution?

Answer No. 4. None of the members used potassium chloride, therefore the question was not answered.

Question No. 5. Can a single nickel salt solution be changed to a double nickel salt solution simply by adding double nickel salt solution?

Answer No. 5. No, but additions of ammonium sulphate will convert the single into a double salt solution.

Question No. 6—What is the cause of a black coating on a hot copper solution after it cools off?

Answer No. 6. The reason for the black was because the carbonate of copper was dissolved in too small a quantity of water, which heated and converted some of the carbonate of copper into an oxide.

Question No. 7. What is a good way to pickel chromium iron?

Answer No. 7. A solution of 5 per cent. ferric chloride, 15 per cent. muriatic acid and 80 per cent. water was recommended.

Hartford-Connecticut Valley Branch

Hartford-Connecticut Valley Branch met on February 25. There was an attendance of ten members and four visitors. There was considerable discussion of the advisability of this branch becoming affilicated with the Hartford Engineers' Club, but further action was postponed pending a more definite invitation from the latter body.

A committee of three, consisting of Messrs. Bagshaw, MacFadyen and Clark, was appointed to arrange another box social to be held on the 4th Mondy in April.

A very good talk on "Nickel Anodes" was given by Mr. Howard Rice of Waterbury. He explained in detail the casting of anodes from the construction of the furnace to the pouring of the metal, and showed a large number of samples to illustrate the difficulties encountered in casting this metal successfully for anodes.

Mr. Hagaboom also spoke on the same subject. He told of experiments carried on with rolled nickel anodes and predicted that in the near future hot rolled anodes would largely replace cast anodes.

Detroit Branch

Regular meeting A. E. S. held Friday, March 7, 1924, at permanent headquarters, at 478 Alexandrine West. President B. E. Miller presiding, with a large attendance. Visitors present were R. C. Hopkins, Hudson

Mortor Car Co. A Sutcliffe Motor Products. C. C. Dewitt, C. G. Spring Co. There were a large number of communications, and action was taken, where necessary.

There were no candidates for election to society.

Allan Edmund Shepherd, Standard Plating Works, Active, Flint, Mich.; Henry John Jameson, Detroit Testing Laboratory, associate, Detroit, Mich., were applicants for membership, which was referred to Board of Managers.

It was moved that Research committee solicit papers for Milwaukee Convention. Banquet Committee reported arrangements practically completed and program will be in hands of printers this week. Prof. Baker, of U. of M. and C. H. Proctor, Founder of Society, will be the speakers and a fine entertainment will be provided.

Research committee reported that all arrangements had been made for Dr. Blum, of Bureau of Standards. Lecture on March 14, 1924, at Cass. Tech., High, Auditorium. Dr. Blum arrives at 6 P. M. after a visit at U. of M. with Prof. Baker and will be met at Depot by research committee, and entertained at dinner.

A committee consisting of C. S. Tompkins, Chairman; A. E. Shepherd, P. Bergin, A. T. Wagner, R. L. Shepherd, was appointed to consider what may be called the sustaining membership.

The meeting was then turned over to Chairman, E. G. Lovering of the research committee, and Hydrofluoric acid ed, introduced the speakers of the evening, Frithiof Stenhagen, Chemical Engineer and B. F. Lewis, Chemist, whose offerings, "Throwing Power" its definition and determining factors and use of the Distribution Box for Better Plating, the latter a practical demonstration of the former, with ideas of his own along the same lines, were gems of the first water, received great applause, and the authors tendered a rising vote of thanks. Sect'y R. L. Shepard of research lines, was elected an active member of the society.

The meting broke up at 11:10, due to length of program, and adjourned until next meeting, April 4, 1924.

Bridgeport Branch

Fellow Platers and Members. Please note that the Bridgeport Branch will move on April 1st to 62 Cannon Street, Room 17.

In our new quarters, we will have an up-to-date laboratory, and will have a nickle, brass, copper, and possibly silver solutions.

Our open meting was held at the Bridgeport Brass recreation rooms, with 68 present. Our speakers committee sent out letters to Manufacturers asking them to attend, and the results were well worth the work.

President John Slattery opened the meeting and then turned the meting over to Mr. W. G. Webster, vice president of the Bridgeport Brass Co. Mr. Webster assured the boys that the Manufacturers were with them and he personally would give us any help that he could to keep the good work going.

Mr. Webster then, introduced Dr. Wm. Blum of the Bureau of Standards, who talked on RESEARCHES IN NICKEL DEPOSITION.

Dr. Blum kept the boys interested for nearly two hours.

In the future, any mail for The Bridgeport Branch should be addressed to P. O. Box 671.

Cleveland Branch

The regular business meeting of the Cleveland Branch of the A. E. S. was held Saturday, February 23, 1924, with President Ter Doest presiding. The minutes of the previous business meeting was read and approved. Among the communications received were letters from Dr. Blum, Supreme Secretary; Hanlon, Milwaukee Secretary; also per capitax statement for second quarter, which was ordered paid. Messrs. Scott, Cyrex and Smith were appointed as a committees to look after Dr. Blum's lecture, which was decided to be held at the Hotel Winton Thursday evening, March 27. The Secretary was instructed to attend to the printing and to secure the room for the meeting.

Newark Branch

The Newark Branch, A. E. S., held its regular meeting at 17 Central Ave., on February 15, 1924, there being 27 members present.

The meting was open in due form by Vice-President, Mr. Roy Stout, who presided in absence of President Clark. Minutes of the previous meeting were read and approved. Applications for membership were received, for Mr. A. P. Muning and Mr. W. H. Terrance, and order to take regular course.

Mr. Oliver Sizelove gave very interesting and instructive talk on "Nickle Shot used as Anodes". The nickle shot was held in a wood holder made of wood about 10by14by¾, containing hook and linned with iron wire mesh to preevnt shot from falling through. The reduction of these shots was good and the percentage of iron deposited was exceedingly small, though after using this holder the iron wire mesh was acted upon.

Another holder about the same size was made but of lead, with the iron wire mesh painted with asphatium. This anode, when working caused the solution to foam slightly, oxidation being taken place on the lead. The iron wire mesh lasted for about two months.

With a proper container, the nickle shot would be of great advantage to the plater. For instance, on scrap, and the getting the correct anode surface per square inch, with the cathode surface in amperage per square inch. A flat anode weighing 20 lbs., size 8 by 16, contains about 304 square inches, and nickel shot anode weighing 20 lbs. of ¼dia. shot 280 shot in on one lb. contains about 1120 square inches of surface expose.

Good nickle shot when used as anode leave very little sedement in bottom of tank, therefor having cleaner solution with practically no deposit of iron.

Philadelphia Branch

Regular meeting of Philadelphia Branch was held March 7th, with the Pres. Geo. Gehling, presiding.

Only routine business was transacted so as to give all the time posible to Dr. Graham, who began a series of lecturers, the purpose of which is to present sufficient of the fundamental theory of Chemistry and details of the manipulation and use of volumetric apparatus to permit the individual to perform analyses involving simple titrations.

Dr. Graham was ably assisted by Mr. Barbar, who gave practical demonstrations at the first two metings.

The branch is fortunate in securing Dr. Graham for these instructive talks, and no member should miss any of these meetings.

Much information will be secured, which could otherwise be obtained only in a complete chemestry course.

Boston Branch

Boston branch held an open meeting on Wednesday, the 5th at the American house at 8 P. M., with Pres. Nihan in the chair.

The regular order of business was suspended as we had with us, Dr. Blum, of the Bureau of Standards, who spoke on the "Researches in Nickel Deposition."

We had with us, about two hundred members and there friends, who enjoyed it very much.

After speaking, the Dr. answered all questions put to him by the members. Some of the members brought along samples of the nickel solutions and they were tested by the new method for acid and were found to be correct.

A vote of thanks was given to Dr. Blum for very fine lecture of his, and it is the wish of Boston branch, that he will come to Boston again.

A final report of the committee on the nickel itch was made by the chairman Mr. Herrick, and this committee stands ready at any time to help any member who may be affected in any way.

Bridgeport Branch

Regular meeting held on Friday, the 15th, with 18 members present.

We regret to advise that Mr. David Fleming was compelled to resign the secretaryship, due to his leaving town to accept the foremanship of the American Chain Co. in York, Pa. The boys wish him the best of luck.

Mr. R. J. O'Connor, 1066 Kossuth street, Bridgeport, Conn, was elected an active member, and was also appointed secretary for the balance of the year. Go to it, Ray.

ELECTED TO MEMBERSHIP

Pittsburgh Branch

Ewan L. Keyes, Active .....943 N. Lincoln Ave., N. S. Pittsburgh, Pa.

St. Louis Branch

A. Riefling, Active .....3924 Winnibago Sta., St. Louis, Mo.

Chicago Branch

George Hirsh, Active .....1527 N. Hamlin Ave., Chicago, Ill.

New York Branch

Alfred Plotsky, Active .....598 Monroe St., Elizabeth, N. J.

Toledo Branch

Thos. De Christopher, Active .....887 Curtis St., Toledo, Ohio
Nicholas J. Kiefer, Active .....1310 Noble St., Toledo, Ohio
Chas. C. Snyde, Active .....1333½ Michigan St., Toledo, Ohio

Waterbury Branch

E. V. Ball .....53 Goffney Place, Waterbury, Conn.

APPLICATIONS FOR MEMBERSHIP

Detroit Branch

Allan E. Shepard .....Standard Plating Works, Flint, Mich.
Henry J. Jameson .....Detroit Testing Laboratory, Detroit, Mich.

St. Louis Branch

John H. Sax, Active .....501 N. Jackson Sta., Belleville, Ill.

Toledo Branch

Thos. De Christopher, Active .....887 Curtis St., Toledo, Ohio
Nicholas J. Kiefer, Active .....1310 Noble St., Toledo, Ohio
Chas. C. Snyde, Active .....133½ Michigan St., Toledo, Ohio

New York Branch

George Gorman .....203 St. Nicholas Ave., Brooklyn, N. Y.
A. Vitrano .....546 Hart St., Brooklyn, N. Y.
Louis Barkan .....1575 St. Mark's Place, Brooklyn, N. Y.
B. U. Dobrin .....4 East 119th St., New York City
H. S. Kelshaw .....Glen Ridge, N. J.
John Heimer .....1144 Summit Ave., Jersey City, N. J.

Chicago Branch

Cyril Kocow, Associate .....4112 W. 21st St. Place, Chicago, Ill.
Albert Pearson, Associate .....155 Grand Ave., Western Springs, Ill.

Dayton Branch

Harry L. Wright .....213 Shaw Ave., Dayton, Ohio

Toronto Branch

Wm. Stone, Active .....Whitby, Ont.
Henry Wallace, Active .....104 Margueretta St., Toronto, Ont.

REINSTATEMENTS

New York Branch

R. E. Massacotte .....417 Chauncey St., Brooklyn, N. Y.

SUSPENSIONS

Detroit Branch

Guy S. Baldwin, Wilber Preston, Sidney Mount, J. A. Murphy, Frank C. Furze.

THE ANNUAL BANQUET

OF THE NEWARK BRANCH, A. E. S.

On Saturday, April 26, 1924

The Newark Branch, A. E. S., will hold their
Sixth Annual Banquet at

ACHTEL-STETTERS BANQUET HALL
842 BROAD ST., NEWARK, N. J.

A cordial invitation is extended to all members and friends of the A. E. S. The committee is making every effort to provide an afternoon meeting of interest to all.

The program, in part, includes addresses by the following:

Royal F. Clark, President of the Newark Branch

Dr. Hiram S. Lukens, of the University of Pennsylvania

Charles H. Proctor, Founder of the American Electroplaters Society

Kenie W. Schwartz; subject, "Chromium Plating"

C. Max Metch; subject, "Commercial Chromium Plating"

Willard Scott; subject, "Zinc Plating"

George Gehling; subject, "Electro-Platers, Past and Present"

In the evening the fun will begin, which includes a good Dinner, Entertainment and Dancing

Come and bring the ladies and spend a profitable afternoon and a pleasant evening

TICKETS $3.00 EACH.

Banquet Committee,
HORACE H. SMITH, Chairman